AU9215903

(12) PATENT ABSTRACT (11) Document No. AU-A-15903/92
(19) AUSTRALIAN PATENT OFFICE

(54) Title
LOAD BEARING FIBRE CEMENT PANEL

International Patent Classification(s)
(51)[5] E04B 002/04 E04B 002/56 E04B 002/58

(21) Application No. : 15903/92 (22) Application Date : 30.04.92

(30) Priority Data

(31) Number	(32) Date	(33) Country
PK5337	02.04.91	AU AUSTRALIA

(43) Publication Date : 22.04.93

(71) Applicant(s)
GRAEME JOHN TILLY

(72) Inventor(s)
GRAEME JOHN TILLY

(57)

This invention involves the creation of a load-bearing wall panel consisting of face sheets of compressed fibre cement. as produced by Hardies, on each side of a core of polystyrene foam. The resultant panel has been used in the past as non- load-bearing panels in framed structures. The face panels have sufficient load bearing capacity for a single storey building, but will fail in buckling unless they are adequately supported by webs to accept the shear stresses imposed if the panel has a bending load. The foam core is unreliable in this regard.

The inventive step in making these panels load-bearing is in glueing vertical webs of fibre cement or other material such as timber or steel rectangular hollow sections to assist the foam in accepting the shear load and to assist the face panels in accepting the local lintel loads at the ends of the panels. For small panels, the vertical webs need only be at the ends where they also encapsulate the foam thereby giving the panel a fire rating. Large panels may need additional vertical webs spaced along their length.

Claim

a) A load bearing sandwich panel consisting of fibre cement sheets on each face of a light weight core material which has end, and if necessary, intermediate structural webs which help to accept loads and which increase the buckling strength of the face sheets.

P/00/011 28591
Regulation 3.2

AUSTRALIA

Patents Act 1990

ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title: LOAD BEARING FIBRE CEMENT PANEL

The following statement is a full description of this invention, including the best method of performing it known to me:-

This invention involves the creation of a load-bearing wall panel consisting of face sheets of compressed fibre cement, as produced by Hardies, on each side of a core of polystyrene foam. The resultant panel has been used in the past as non- load-bearing panels in framed structures. The face panels have sufficient load bearing capacity for a single storey building, but will fail in buckling unless they are adequately supported by webs to accept the shear stresses imposed if the panel has a bending load. The foam core is unreliable in this regard.

The inventive step in making these panels load-bearing is in glueing vertical webs of fibre cement or other material such as timber or steel rectangular hollow sections to assist the foam in accepting the shear load and to assist the face panels in accepting the local lintel loads at the ends of the panels. For small panels, the vertical webs need only be at the ends where they also encapsulate the foam thereby giving the panel a fire rating. Large panels may need additional vertical webs spaced along their length.

The thickness of the vertical webs can be chosed to accept whatever lintel load is required to suit the type of building on which the panels are to be used.

The top and bottom edges of the panels can be covered by strips of fibre cement to assist in distributing local loads into the face panels and to complete the encapsulation of the foam core.

The panels can be tied into the floor slab or bolted to a supporting frame by drilling holes near the top and botom edges.

The panels can be fitted with vertical rods during fabrication with anchor plates set into the bottom cover strip. The top extremity of these rods can be used to bolt down roof members, or, if the panels are required to accept high wind or seismic loads, they can be post tensioned to ensure that the face panels do not come under tensile stress.

The structure of the load bearing sandwich fibre cement panel can best be understood by reference to FIGS. 1, 2 and 3.

FIG. 1. is a sectional view in which:-

1) is polystyrene core

2) is compressed fibre cement face panel

3) are the end fibre cement shear strips

4) is an intermediate vertical web

6) are the vertical lifting rods.

FIG. 2 is an isometric view of a typical panel showing how the foam is encapsulated by the end strips (3) and the top and bottom covering strips (8), which complete the encapsulation of the foam core and which help distribute the loads from the wall plate into the face panels.

FIG. 4 is an isometric view of an alternative embodiment of the panel, in which load-bearing capacity is increased by the use of square hollow steel sections (9). These have the added advantage that lintels (ii) can be directly bolted to them and they transfer the loads therefrom direct to the base of the structure. In this view the top and bottom sheets (8) are shown dotted to reveal the internal structure of the panel. (10) is a typical anchor plate into which the lifting rod (6) is threaded.

FIG. 3 is a section YY showing the foam core (1), a typical anchore bolt (5), a lifting/post tensioning rod (6) and a lifting eye (7).

FIG. 5 is a section showing how sheets of fibre cement can be glued together to allow load bearing panels of any size to be made.

*The claims defining the invention are as follows:- a) A load bearing sandwich panel consisting of fibre cement sheets on each face of a light weight core material which has end, and if necessary, intermediate structural webs which help to accept loads and which increase the buckling strength of the face sheets.

b) A load bearing panel, as in (a) above, in which the end and, where used, the intermediate structural webs are made of fibre cement.

c) A load bearing panel, as in (a) and (b) above, in which the end, and where used, the intermediate structural webs are made of timber or hollow steel structural sections to which lintels can be bolted.

d) A load bearing panel as in (a), (b) or (c) above, in which the top and bottom edges are faced with a structural section such as fibre cement, timber, steel or aluminium, to complete the encapsulation of the lightweight core material so it can be fire rated.

e) A load bearing panel as in (a), (b), (c) or (d) above, in which the face sheets are spliced together to allow the panels to be wider than the width of the largest commercially available sheets of fibre cement.

f) A load bearing panel as in (a) to (e) above, in which the core is a layer of polystyrene foam or polystyrene beads in a cement matrix or is a lightweight foam concrete.

GRAEME JOHN TILLY
(Name of Applicant)
(BLOCK LETTERS)

30-4-92
(Date)

* Note: If there is insufficient space above to type the statement of claim, do not use this sheet, but use separate sheets of paper beginning with the words "The claims defining the invention are as follows:" and ending with the date and the name of the applicant in block letters.

15903/92

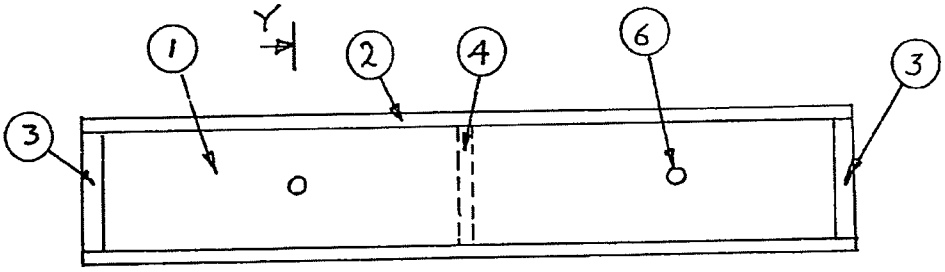

FIG 1

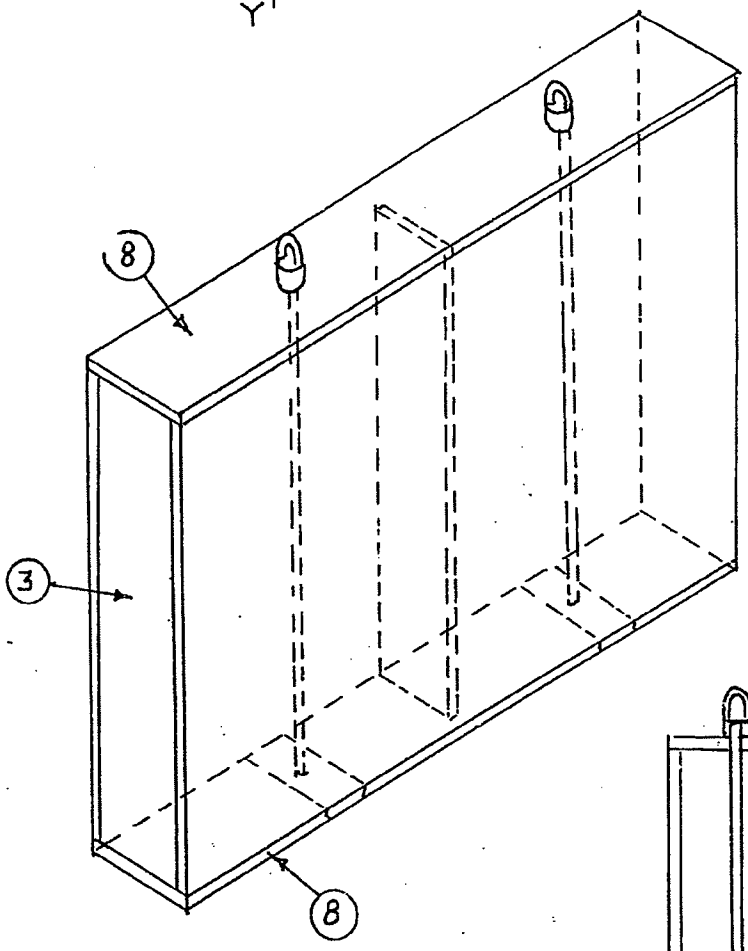

FIG 2

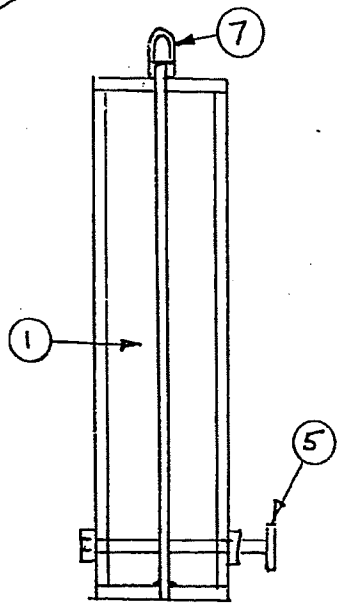

FIG 3

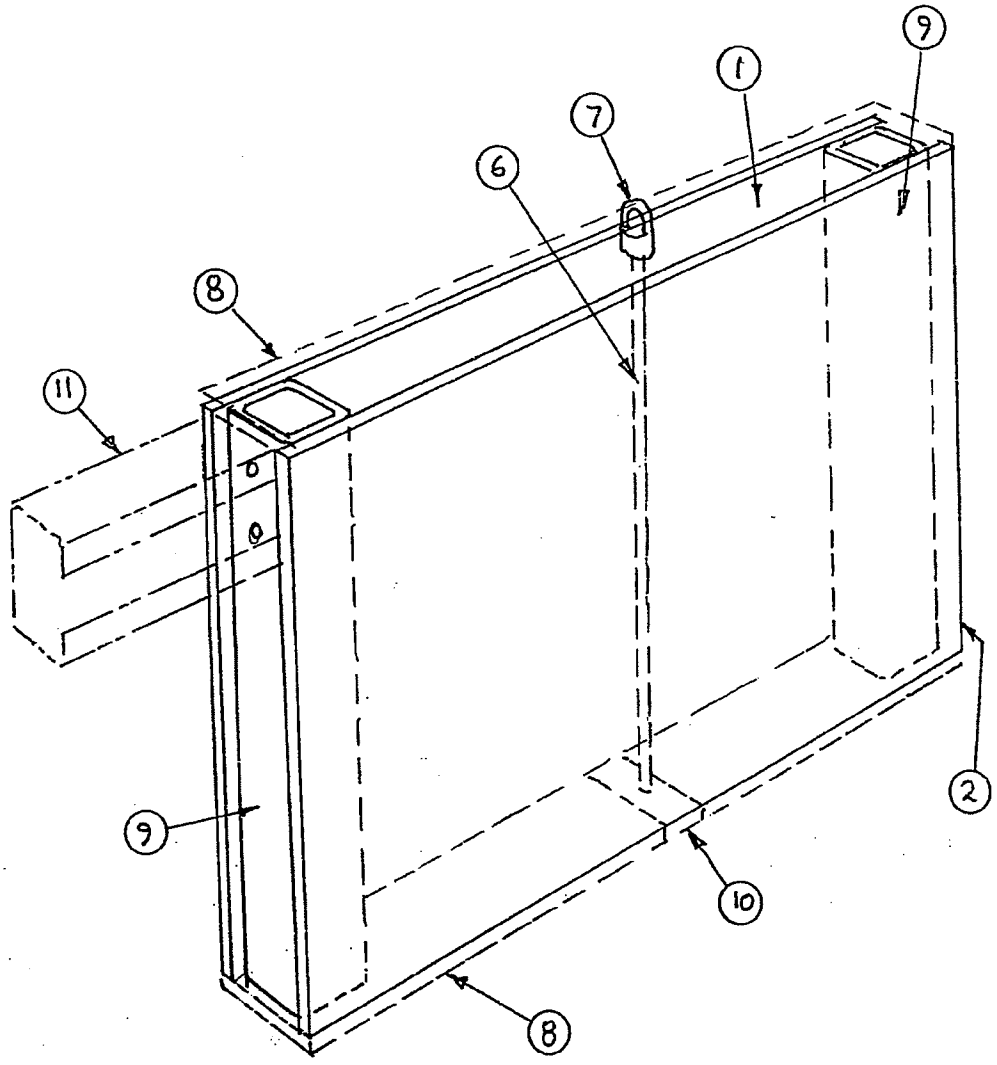

FIG 4

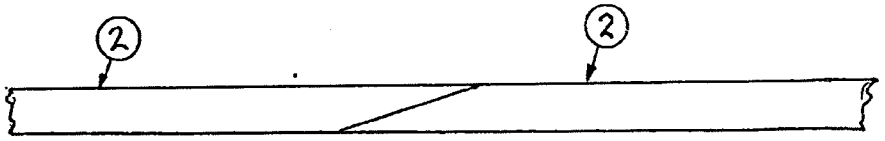

FIG 5

ABSTRACT

This patent application reveals a load bearing wall panel which depends for its structural adequacy on the compressive strength of fibre cement sheets which form the outer skins of a sandwich panel. The core of the panel is any suitable lightweight material. Structural ribs of steel, timber or fibre cement sheet are used to enhance the load bearing capacity primarily by preventing the fibre cement sheets from buckling. They also encapsulate the lightweight core material to give the panel a good fire rating.

The claims defining the invention are as follows:-

a) A load bearing sandwich panel consisting of fibre cement sheets on each face of a light weight core material which has end, and if necessary, intermediate structural webs which help to accept loads and which increase the buckling strength of the face sheets.

b) A load bearing panel, as in (a) above, in which the end and, where used, the intermediate structural webs are made of fibre cement.

c) A load bearing panel, as in (a) and (b) above, in which the end, and where used, the intermediate structural webs are made of timber or hollow steel structural sections to which lintels can be bolted.

d) A load bearing panel as in (a), (b) or (c) above, in which the top and bottom edges are faced with a structural section such as fibre cement, timber, steel or aluminium, to complete the encapsulation of the lightweight core material so it can be fire rated.

e) A load bearing panel as in (a), (b), (c) or (d) above, in which the face sheets are spliced together to allow the panels to be wider than the width of the largest commercially available sheets of fibre cement.

f) A load bearing panel as in (a) to (e) above, in which the core is a layer of polystyrene foam or polystyrene beads in a cement matrix or is a lightweight foam concrete.